ABSTRACT:

The present paper considers the steady free convection boundary layer flow of a viscoelastics fluid with constant temperature in the presence of heat generation. The boundary layer equations are an order higher than those for the Newtonian (viscous) fluid and the adherence boundary conditions are insufficient to determine the solution of these equations completely. The governing boundary layer equations are first transformed into non-dimensional form by using special dimensionless group. Computations are performed numerically by using Keller-box method by augmenting an extra boundary condition at infinity and the results are displayed graphically to illustrate the influence of viscoelastic K, heat generation ?, and Prandtl Number, Pr parameters on the velocity and temperature profiles. The results of the surface shear stress in terms of the local skin friction and the surface rate of heat transfer in terms of the local Nusselt number for a selection of the heat generation parameter ? (=0.0, 0.2, 0.5, 0.8, 1.0) are obtained and presented in both tabular and graphical formats. Without effect of the internal heat generation inside the fluid domain for which we take ? = 0.0, the present numerical results show an excellent agreement with previous publication.